

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:  
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## PCT

### WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing  
(day/month/year)

25 FEB 2005

*Response due  
May 25, 2005  
d/s/*

Applicant's or agent's file reference

ABD-001

**FOR FURTHER ACTION**

See paragraph 2 below

International application No.

PCT/US04/11068

International filing date (day/month/year)

09 April 2004 (09.04.2004)

Priority date (day/month/year)

22 April 2003 (22.04.2003)

International Patent Classification (IPC) or both national classification and IPC

IPC(7): G05F 1/44 and US Cl.: 323/282

Applicant

DOWLATABADI, AHMAD B.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

#### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ US

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Alexandria, Virginia 22313-1450

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Authorized officer

Michael Sherry

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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/11068

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G05F 1/44

US CL : 323/282

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 323/282,223,224,284,288

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,485,077 A (WERRBACH) 16 January (16.01.1996), column 2 lines 6-16. <i>xx</i>	1-15
Y	<i>x</i> US 6,466,069 B1(ROZENBLIT et al) 15 October 2002 (15.10.2002) entire doc.	1 and 9
Y	<i>x</i> US 5,502,629 A (ITO et al) 26 March 1996 (26.03.1996), entire doc.	15
<i>* Previously disclosed in U.S. app'n.</i> <i>* x Disclosed in U.S. app'n upon receipt from. PTO office (4)</i>		



Further documents are listed in the continuation of Box C.



See patent family annex.

<p>* Special categories of cited documents:</p>		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

28 January 2005 (28.01.2005)

Date of mailing of the international search report

25 FEB 2005

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**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US04/11068

**Box No. I Basis of this opinion**

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This opinion has been established on the basis of a translation from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐ a sequence listing

☐ table(s) related to the sequence listing

b. format of material

☐ in written format

☐ in computer readable form

c. time of filing/furnishing

☐ contained in international application as filed.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

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Box No. V Reasoned statement under Rule 43 *bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims <u>15</u>	YES
	Claims <u>1-14</u>	NO
Inventive step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-15</u>	NO
Industrial applicability (IA)	Claims <u>1-15</u>	YES
	Claims <u>NONE</u>	NO

2. Citations and explanations:

Please See Continuation Sheet

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

V. 2. Citations and Explanations:

Claims 1-14 lack novelty under PCT Article 33(2) as being anticipated by the admitted prior art figure 1 in view of Werrback (US 5,485,077) and further in view of Rozenblit et al (US 6,466,069).

Claim 1; APA figure 1 discloses a regulation loop for a switching power converter having a pulse width variable modulator operating switches (M1, M2); a bridge filter section (Lo, Co), with a power output node feeding a load, the bridge filter section having a first transfer function with inherent poles and zeros; a comparator (23) having a high impedance first input sampling a voltage from the power output node of the switching power converter as a first input signal and having a second input signal from a reference supply representing a target voltage level for the load, the comparator having an output signal on an output line with a high or low signal depending on whether first input signal exceeds the second input signal.

However, the APA figure 1 does not disclose a filter connected to the comparator receiving the comparator output signal and to deliver a filter output signal, the filter having a second order transfer function, the second order transfer function established by a selection of filter components offsetting the poles and zeros of the first transfer function, operating the variable parameter of the pulse width variable.

Werrback teaches a comparator (20) and filter (19) receiving a comparator output signal (see also col. 2 lines 6-16).

However, Werrbach do not disclose the filter having a second order transfer function.

Second order filters are common and well known in the art. Rozenblit et al teaches a loop filter that utilizes a second order filter; such a loop filter integrates the current pulses and provides a steady DC voltage.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the APA figure 1 to include a filter connected to the comparator receiving the comparator output signal and to deliver a filter output signal as taught by Werrbach in order to compensate for a change in the output characteristics of the converter and it would have been obvious to use a filter having a second order transfer function, the second order transfer function established by a selection of filter components for offsetting the poles and zeros of the first transfer function as taught by Rozenblit et al in order to provide a steady DC voltage.

Claims 2-8; Rozenblit et al teach using a charge pump connected to a filter with capacitors and a resistor for biasing the filter by adding and subtracting charge from the capacitors.

Claim 9-14; APA figure 1 discloses a regulation loop for a switching power converter having a pulse width variable modulator operating switches; and a bridge filter section, with a power output node feeding a load, the variable parameter of the modulator establishing an amount of regulation and efficiency of the power converter, comprising: a comparator (23) having a high impedance first input sampling a voltage from the power output node of the switching power converter as a first input signal and having a second input signal from a reference supply representing a target voltage level for the load, the comparator having an output signal on an output line with a high or low signal depending on whether first input signal exceeds the second input signal or not.

However, the APA figure 1 does not disclose a charge pump connected to receive the output signal from the comparator and either source or sink current in response thereto as a current signal; and a filter connected to the comparator receiving the current signal and delivering a filter output signal operating a pulse width variable modulator.

Rozenblit et al teach a charge pump connected to a filter comprising capacitors and resistors for biasing the filter by adding and subtracting charge from the capacitor(s).

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**Supplemental Box**

**In case the space in any of the preceding boxes is not sufficient.**

Werrbach teach a comparator (20) and filter (19) receiving the comparator output signal.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the APA figure 1 to include a charge pump connected to receive the output signal from the comparator and either source or sink current in response thereto as a current signal as taught by Rozenblit et al in order to provide a steady DC voltage; and it would have been obvious to use a filter connected to the comparator receiving the current signal and delivering a filter output signal operating a pulse width variable modulator as taught by Werrbach in order to compensate for a change in the output characteristics of the converter.

Claim 15 lacks an inventive step under PCT Article 33(3) as being obvious over admitted prior art figure 1, Werrbach (US 5,485,077) and Rozenblit et al (US 6,466,069) in view of Ito et al (US 5,502,629).

Claim 15; APA figure 1, Boylan et al and Rozenblit et al disclose the claimed subject matter in regards to claim 9 supra, except for the charge pump comprises an inverter arrangement of MOS transistors, with a pair of bias transistors connected to the inverter arrangement.

Ito et al teaches charge pump details including mos transistors and bias transistors and inverters. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a charge pump with inverters, mos transistors and bias transistors in order to boost the efficiently and in a stable manner.